Hydrogeology of the Kissimmee Basin

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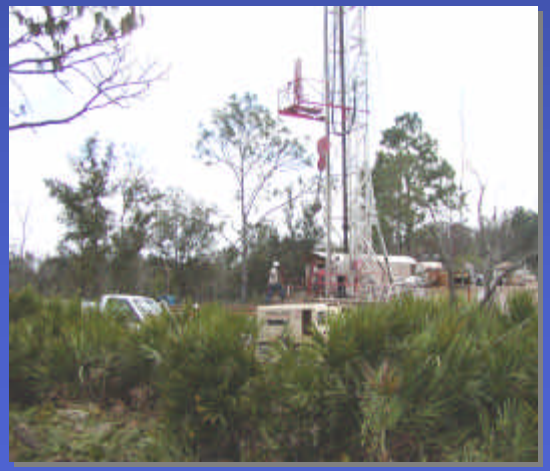
January 29, 2004

Scope of Talk

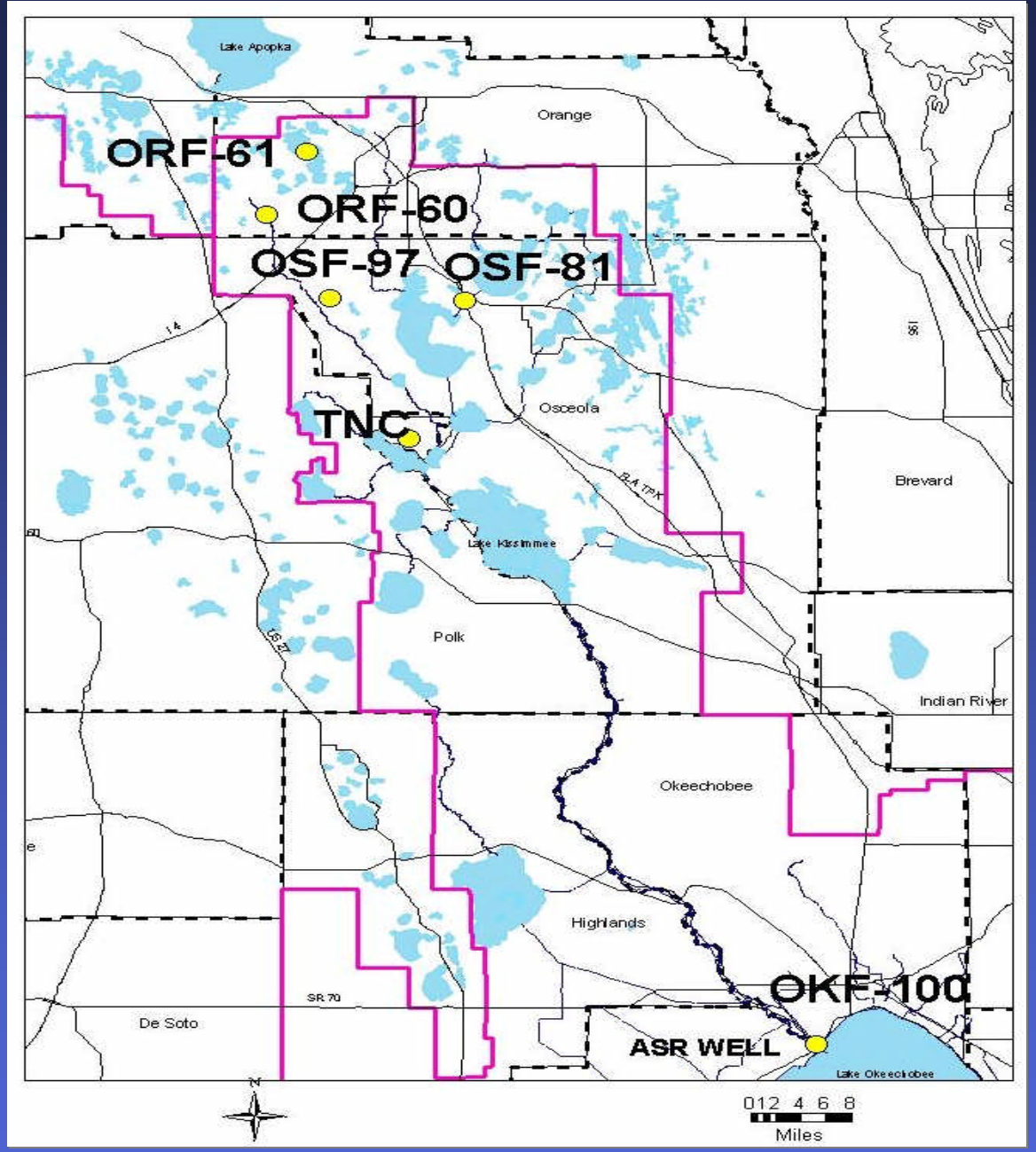
- Exploratory Drilling Program
- Floridan/Surficial Aquifer Interaction - Paired Well Sites
- USGS Reports

Exploratory Drilling and Testing

Intercession City (W. Osceola County)	$730K
R.D. Keene Park (Orange County)	$225K
Reedy Creek (Orange County)	$375K
City of St. Cloud (Osceola County)	~$360K
The Nature Conservancy (Osceola County)	$125K
ASR Pilot: Kissimmee River well	$570K
Grand Total:	$2.385 M



Floridan Aquifer System Drilling Sites



Drilling at Intercession City

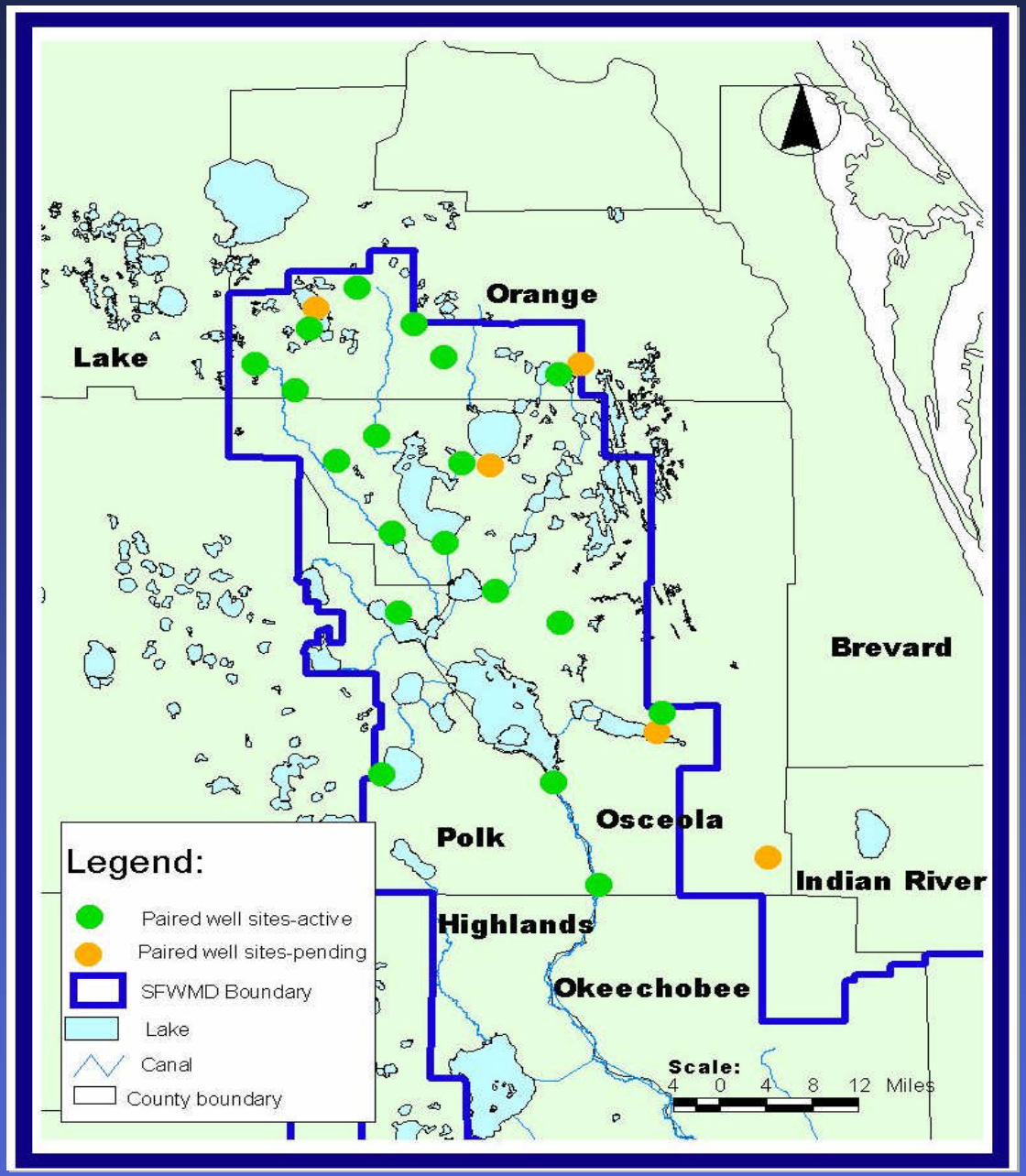
Data Acquired in Exploratory Testing Program

- Lithologic
- Geophysics
- APT's and Packer Tests
- Water levels and quality with depth
- Long term monitoring of water levels and quality

Surficial/Floridan Aquifer Interaction

- **Purpose:**
  - Develop a spatially distributed network of sites
  - Paired wells (Surficial & Floridan) at each site
  - Determine interaction/communication between aquifers
- **Scope:**
  - 24 Sites constructed
  - Electronic water level recorders installed at 19 sites (Active)

Surficial/ Floridan Aquifer Paired Well Sites



Paired Well Sites: Surficial Aquifer/Floridan Aquifer

Example of an Installed Data logger

USGS Cooperative Studies $3.58 Million

- **O'Reilly and Spechler, 2002: WRI 02-4193,** *Hydrogeology and Water Quality of the Lower Floridan aquifer in East Central Florida*
- **Sepulveda, 2002: WRI 02-4009,** *Simulation of Ground water flow in the Intermediate and Floridan aquifer Systems in Peninsular Florida*
- **Adamski and German, 2003 Draft WRI,** *Hydrologeology and Quality of Ground Water in Orange County, Florida;* ***and*** *Hydrology and Water quality of lakes and streams in Orange County, Florida*
- **Spechler, 2004 New Start,** *Hydrologic and water-quality conditions in Polk County, Florida*

Funding Partners

- City of Kissimmee
- Orange County
- Polk County
- Reedy Creek Energy Services
- The Nature Conservancy
- SJRWMD
- SWFWMD
- U.S. Geological Survey

USGS Studies Summary Sheet WRIR 02-4009

- Simulation of groundwater flow in the Intermediate and Floridan Aquifer systems in peninsular Florida (Sepulveda)
  - Purpose:
    - Test and refine conceptual understanding of the regional groundwater flow system in both aquifers
    - Develop a database to support subregional groundwater flow modeling
    - Evaluate the effects of projected 2020 groundwater withdrawals on groundwater levels

USGS Studies Summary Sheet WRIR 02-4009 (cont.)

- Conclusions:
  - Projected 2020 withdrawals increased ~36% from 1994 to 3,400 million gallons per day in the model area
  - Largest projected drawdowns in central Orange County (10 feet) and in parts of Duval and Polk Counties (6 feet)

USGS Studies Summary Sheet WRIR 02-4193

- Hydrogeology and water quality characteristics of the Lower Floridan aquifer in East-Central Florida (O'Reilly, Spechler, & McGurk)
  - Purpose:
    - Describe the hydrogeologic framework of the lower Floridan aquifer (LFA)
    - Refine existing maps depicting the tops and thicknesses of the confining units within the Floridan aquifer system
    - Delineate directions and gradients of groundwater flow in the LFA
    - Describe water quality in the LFA
    - Approximate depth of freshwater-saltwater interface

USGS Studies Summary Sheet WRIR 02-4193 (cont.)

- Conclusions:
  - Groundwater flow in LFA generally from southwest to northeast in study area
  - Freshwater-saltwater interface ranges from ~200 feet below land surface (bls) in eastern part of the study area to >3,000 feet bls in southwestern part of the study area

USGS Studies Summary Sheet WRIR- (in press)

- Hydrogeology and water quality of lakes and streams in Orange County, Florida (German & Adamanski)
  - Purpose:
    - Describe current surfacewater resources of Orange County including water quality
    - Determine any temporal changes or trends in the quantity and quality of the water resources since the last county-wide study particularly with regard to land-use changes

USGS Studies Summary Sheet
WRIR- (in press) (cont.)

- Conclusions:
  - Generally an increase in streamflow was observed. The increase may be due to the land use changes in the county as well as increased use of water from the Floridan aquifer for irrigation
  - Water level trends in lakes showed mixed results
  - Phosphorus concentrations in surface water bodies decreased